

PATENT ABSTRACTS OF JAPAN

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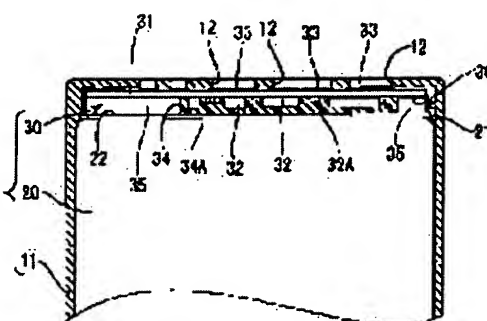
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(54) BATTERY PACK

(57)Abstract:

PROBLEM TO BE SOLVED: To prevent breakage of a protection circuit by external force and achieve overall miniaturization.

SOLUTION: A protection circuit 30 and a battery body 20 are accommodated in a battery case 11. While forming a flat surface 34A opposite the circuit board 31, a mold resin layer molding an electronic parts 32 is formed on the protection circuit 30. The battery case 11 is accommodated in a state in which the flat surface 34A of the mold resin layer 34 is brought into contact with the flat surface of the battery body 20.



- 10.....電池パック
- 11.....電池ケース
- 20.....電池本体
- 30.....保護回路
- 31.....回路基板
- 32.....電子部品
- 34.....モールド樹脂層
- 34A.....平坦面
- 35.....樹脂層非形成部
- 48.....押え部

LEGAL STATUS

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CLAIMS

[Claim(s)]

[Claim 1] The cell pack characterized by to be held in said cell case where the mold resin layer which forms a flat side in a front face and carries out the mold of said electronic parts is formed in said protection network in the thing which comes to hold the cell proper which held the generation-of-electrical-energy element, and the protection network which mounted and constituted electronic parts in the circuit board in a cell case and said flat side of the mold resin layer is contacted to the flat side of said cell proper.

[Claim 2] The cell pack according to claim 1 characterized by mounting the bare chip of an integrated circuit in the circuit board of said protection network as said electronic parts.

[Claim 3] The cell pack according to claim 1 or 2 characterized by preparing the resin layer agenesis section which does not form said mold resin layer in the edge of said circuit board, and preparing the cell terminal for connecting the lead from said cell proper to the circuit board of the resin layer agenesis section.

[Claim 4] Said mold resin layer is a cell pack according to claim 1 to 3 characterized by slushing thermosetting resin as said electronic parts are embedded on said circuit board, making the top face of the thermosetting resin harden a die in the state of *****, and having formed said flat side.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the cell pack which held the cell proper and the protection network in one at the cell case.

[0002]

[Description of the Prior Art] As this kind of a cell pack, the structure shown in drawing 5 and drawing 6 is known. This holds the cell proper 2 which held the generation-of-electrical-energy element in the cell case 1 of the shape of 2 rates which makes a thin cube type, and the protection network 5 which mounted and constituted two or more electronic parts 4 in the circuit board 3, and is constituted. A protection network 5 is formed so that the end face of a cell proper 2 may be met, and it is arranged so that it may become a compact configuration with a thin shape as much as possible.

[0003] Here, the electronic parts 4 mounted in the circuit board 3 of a protection network 5 have various height. For this reason, supposing it contacts this to the end face of a cell proper 2 directly, when external force acts on the time of an assembly, or a protection network 5 temporarily, in order that only the tallest electronic parts 4 may contact the end face of a cell proper 2, unnecessary stress acts on the circuit board 3, and there is fear of breakage. For this reason, the rib 6 for supporting the circuit board 3 in the cell case 1 is formed, and he floats and is trying to support conventionally, so that electronic parts 4 may not contact a cell proper 2 in response to the circuit board 3 with this rib 6 as shown in drawing 6. In addition, between a cell proper 2 and a protection network 5, although the circuit board 3 should bend, the insulation sheet 7 is arranged so that electronic parts 4 may not contact a cell proper 2.

[0004]

[Problem(s) to be Solved by the Invention] However, with the above-mentioned configuration, the big force acted on the circuit board 3 temporarily, after this separated from the rib 6, stress may act on the circuit board 3, it may result in breakage of components, and there was a problem that it had to carry out like an assembler very carefully. Moreover, since the rib 6 had to be cast in the cell case 1, there was a problem that the dimension of the cell case 1 becomes large by the thickness of the rib 6, and the so-called HIKE arose on the external surface of the cell case 1, and outside appearance worsened.

[0005] Then, this invention can prevent stress acting on the circuit board and resulting in breakage of a protection network, and aims at moreover offering the cell pack which can also miniaturize the whole.

[0006]

[Means for Solving the Problem] Invention concerning claim 1 forms in said protection network the mold resin layer which forms a flat side in a front face and carries out the mold of the electronic parts, and has the description in the configuration which holds in a cell case where the flat side of the mold resin layer is contacted to the flat side of a cell proper in the thing which comes to hold the cell proper which held the generation-of-electrical-energy element, and the protection network which mounted and constituted electronic parts in the circuit board in a cell case.

[0007] Invention concerning claim 2 has the description at the place which mounted the bare chip of an integrated circuit in the circuit board. Moreover, invention of claim 3 has the description at the place in which the resin layer agenesis section which does not form a mold resin layer in the edge of the circuit board was prepared, and the cell terminal for connecting the lead from a cell proper to the circuit board of the resin layer agenesis section was prepared. In invention of claims 1-3, invention of claim 4 slushes thermosetting resin so that electronic parts may be embedded for a mold resin layer on the circuit board, and it has the description at the place which the top face of the thermosetting resin was made to harden a die in the state of *****, and formed the flat side in it.

[0008]

[Function and Effect of the Invention] According to invention of claim 1, the mold resin layer which made the front face the flat side is formed in the circuit board of a protection network, and the flat side is contacted to the cell proper. For this reason, if external force acts on the circuit board of a protection network and a protection network is forced on a cell proper, the flat side of a mold resin layer will come to be forced on the flat side of a cell proper. Consequently, the electronic parts which it will be caught throughout the flat side of a mold resin layer, and unnecessary stress did not act on the circuit board, and were mounted there do not damage the external force which acted on the protection network. Moreover, since a circuit is insulated by the mold resin layer, conventionally, the insulating paper needed between cells proper also becomes unnecessary, and a miniaturization can be attained further.

[0009] According to invention of claim 2, since the bare chip of an integrated circuit is mounted in the circuit board, a protection network can be miniaturized further, and moreover, a mold resin layer can perform protection of a bare chip. And according to invention of claim 3, since the resin layer agenesis section was prepared in the edge of the circuit board and the terminal for connecting the lead from a cell proper is prepared here, the space equivalent to a part for the thickness of a mold resin layer is formed in the edge of the circuit board, and can make connection with a cell proper using here, and much more miniaturization of it is attained. In addition, this resin layer agenesis section may be formed only in one [at least] edge of the both ends of the circuit board.

[0010] Moreover, according to invention of claim 4, since a die is stiffened for the thermosetting resin slushed on the circuit board in the state of *****, a highly precise flat side can be formed in the front face of a mold resin layer using the flat side of a die.

[0011]

[Embodiment of the Invention] This invention is explained with reference to a drawing about 1 operation gestalt applied to the cell pack for cellular phones.

[0012] Drawing 1 is the configuration of having held the cell proper 20 and the protection network 30 in the cell case 11 where the appearance of the cell pack 10 concerning this operation gestalt is shown, and a flat rectangular parallelepiped configuration is made (refer to drawing 2). This cell case 11 is a product made from plastics, is carried out in the thickness direction 2 ****, and three terminal apertures 12 for external connection are located in a line, and it is formed in the top face. The cell proper 20 held in the interior is making the flat rectangular parallelepiped configuration which consisted of flat sides too, for example, seals a lithium ion type generation-of-electrical-energy element in the cell can made from aluminum, and is constituted.

[0013] As a protection network 30 is shown in drawing 2 , two or more electronic parts 32 are mounted in one field of the circuit board 31, it becomes, and three external terminals 33 for external connection are formed in the field of the opposite side. When this external terminal 33 is exposed outside from the terminal aperture 12 of said cell case 11 and a portable telephone is equipped with this cell pack 10, the terminal by the side of a portable telephone contacts the above-mentioned external terminal 33. In addition, as for the part of the electronic parts 32, bare chip 32A of an integrated circuit is contained, and this is directly connected to the circuit board 31.

[0014] Now, the mold resin layer 34 which embeds electronic-parts 32 group is formed in the field of an external terminal and the opposite side among the above-mentioned circuit boards 31. This is formed as follows. As electronic-parts 32 group is mounted, it installs by turning electronic-parts 32 group up and the printed circuit board 40 which takes much above-mentioned circuit boards 31, and could be made to do them is shown in drawing 4 (A), the die 41 of the shape of a frame which surrounds the periphery of a printed circuit board 40 on it is arranged. And in a die 41, the epoxy resin 42 which is thermosetting resin is slushed (this drawing (B)), and, subsequently the open top face of a die 41 is closed with the presser-foot mold 43 with which the inferior surface of tongue is flat (this drawing (C)). This presses down the top face of an epoxy resin 42, it becomes the form stuck and held down with the mold 43, an epoxy resin 42 hardens in the condition, and the mold resin layer 34 is formed. Then, if both the molds 41 and 43 are opened (this drawing (D)), the top face of the mold resin layer 34 will be set to flat side 34A by the inferior surface of tongue of the presser-foot mold 43. Next, if a dicing saw divides the mold resin layer 34 with the circuit board 31, for example (this drawing (E)), many protection networks 30 will be obtained. In addition, the resin layer agenesis section 35 which does not form the mold resin layer 34 is formed in the right-and-left both ends of the circuit board 31 of the above-mentioned protection network 30. The cell terminal 36 is formed in the field (inferior surface of tongue) of the side which formed the mold resin layer 34 in the circuit board 31 of the resin layer agenesis section 35 (the inside of drawing 2 , right-hand side edge) of one of these. The cell terminal (not shown) of another side is formed in the field (top face) of the opposite side with the side which formed the mold resin layer 34 in the circuit board 31 of the resin layer agenesis section 35 (the inside of this drawing, left-hand side edge) of another side.

[0015] The protection network 30 of such a configuration contacts flat side 34A of the mold resin layer 34

to the end face of a cell proper 20, is piled up, and is held in the cell case 11 in the condition. Moreover, the lead wire 21 installed from the inferior-surface-of-tongue side of a cell proper 20 is welded to the cell terminal 36 of the circuit board 31, and the lead wire 22 installed from the top-face side of a cell proper 20 is welded to the cell terminal of another side.

[0016] According to this operation gestalt of the above-mentioned configuration, when a portable telephone is equipped with the cell pack 10, the terminal of a portable telephone is pressed against the external terminal 33 of the cell pack 10, and local external force may act on a protection network 30 through the external terminal 33. Moreover, since a protection network 30 is forced on the end face of a cell proper 20 and it holds in the cell case 11 at the time of the assembly of the cell pack 10, local external force may act on a protection network 30. With this operation gestalt, since the whole region touches [flat side 34A of the mold resin layer 34 of a protection network 30] the end face of a cell proper 20 even if such external force acts, the flat side 34A whole region is forced on the end face of a cell proper 20. Consequently, it can prevent certainly that the electronic parts 32 which it will be caught throughout the end face of a cell proper 20, and local stress did not act on the circuit board 31, and were mounted there damage the external force which acted on the protection network 30.

[0017] Moreover, with this operation gestalt, since it insulates electrically by the mold resin layer 34, conventionally, the insulating paper needed between cells proper 20 becomes unnecessary, and the part and a miniaturization can be attained. And with this operation gestalt, since the bare chip of an integrated circuit is mounted in some electronic parts 32, a protection network 30 can be miniaturized further, and moreover, the mold resin layer 34 can perform protection of a bare chip.

[0018] In addition, this invention is not limited to the gestalt of the operation explained with the above-mentioned description and a drawing, within limits which do not deviate from a summary, can be changed variously and can be carried out.

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TECHNICAL FIELD

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EFFECT OF THE INVENTION

[Function and Effect of the Invention] According to invention of claim 1, the mold resin layer which made the front face the flat side is formed in the circuit board of a protection network, and the flat side is contacted to the cell proper. For this reason, if external force acts on the circuit board of a protection network and a protection network is forced on a cell proper, the flat side of a mold resin layer will come to be forced on the flat side of a cell proper. Consequently, the electronic parts which it will be caught throughout the flat side of a mold resin layer, and unnecessary stress did not act on the circuit board, and were mounted there do not damage the external force which acted on the protection network. Moreover, since a circuit is insulated by the mold resin layer, conventionally, the insulating paper needed between cells proper also becomes unnecessary, and a miniaturization can be attained further.

[0009] According to invention of claim 2, since the bare chip of an integrated circuit is mounted in the circuit board, a protection network can be miniaturized further, and moreover, a mold resin layer can perform protection of a bare chip. And according to invention of claim 3, since the resin layer agensis section was prepared in the edge of the circuit board and the terminal for connecting the lead from a cell proper is prepared here, the space equivalent to a part for the thickness of a mold resin layer is formed in the edge of the circuit board, and can make connection with a cell proper using here, and much more miniaturization of it is attained. In addition, this resin layer agensis section may be formed only in one [at least] edge of the both ends of the circuit board.

[0010] Moreover, according to invention of claim 4, since a die is stiffened for the thermosetting resin slushed on the circuit board in the state of *****, a highly precise flat side can be formed in the front face of a mold resin layer using the flat side of a die.

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[0013] As a protection network 30 is shown in drawing 2 , two or more electronic parts 32 are mounted in one field of the circuit board 31, it becomes, and three external terminals 33 for external connection are formed in the field of the opposite side. When this external terminal 33 is exposed outside from the terminal aperture 12 of said cell case 11 and a portable telephone is equipped with this cell pack 10, the terminal by the side of a portable telephone contacts the above-mentioned external terminal 33. In addition, as for the part of the electronic parts 32, bare chip 32A of an integrated circuit is contained, and this is directly connected to the circuit board 31.

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[0015] The protection network 30 of such a configuration contacts flat side 34A of the mold resin layer 34 to the end face of a cell proper 20, is piled up, and is held in the cell case 11 in the condition. Moreover, the lead wire 21 installed from the inferior-surface-of-tongue side of a cell proper 20 is welded to the cell terminal 36 of the circuit board 31, and the lead wire 22 installed from the top-face side of a cell proper 20 is welded to the cell terminal of another side.

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TECHNICAL PROBLEM

[Description of the Prior Art] As this kind of a cell pack, the structure shown in drawing 5 and drawing 6 is known. This holds the cell proper 2 which held the generation-of-electrical-energy element in the cell case 1 of the shape of 2 rates which makes a thin cube type, and the protection network 5 which mounted and constituted two or more electronic parts 4 in the circuit board 3, and is constituted. A protection network 5 is formed so that the end face of a cell proper 2 may be met, and it is arranged so that it may become a compact configuration with a thin shape as much as possible.

[0003] Here, the electronic parts 4 mounted in the circuit board 3 of a protection network 5 have various height. For this reason, supposing it contacts this to the end face of a cell proper 2 directly, when external force acts on the time of an assembly, or a protection network 5 temporarily, in order that only the tallest electronic parts 4 may contact the end face of a cell proper 2, unnecessary stress acts on the circuit board 3, and there is fear of breakage. For this reason, the rib 6 for supporting the circuit board 3 in the cell case 1 is formed, and he floats and is trying to support conventionally, so that electronic parts 4 may not contact a cell proper 2 in response to the circuit board 3 with this rib 6 as shown in drawing 6 . In addition, between a cell proper 2 and a protection network 5, although the circuit board 3 should bend, the insulation sheet 7 is arranged so that electronic parts 4 may not contact a cell proper 2.

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MEANS

[Means for Solving the Problem] Invention concerning claim 1 forms in said protection network the mold resin layer which forms a flat side in a front face and carries out the mold of the electronic parts, and has the description in the configuration which holds in a cell case where the flat side of the mold resin layer is contacted to the flat side of a cell proper in the thing which comes to hold the cell proper which held the generation-of-electrical-energy element, and the protection network which mounted and constituted electronic parts in the circuit board in a cell case.

[0007] Invention concerning claim 2 has the description at the place which mounted the bare chip of an integrated circuit in the circuit board. Moreover, invention of claim 3 has the description at the place in which the resin layer agenesis section which does not form a mold resin layer in the edge of the circuit board was prepared, and the cell terminal for connecting the lead from a cell proper to the circuit board of the resin layer agenesis section was prepared. In invention of claims 1-3, invention of claim 4 slushes thermosetting resin so that electronic parts may be embedded for a mold resin layer on the circuit board, and it has the description at the place which the top face of the thermosetting resin was made to harden a die in the state of *****, and formed the flat side in it.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The perspective view of the cell pack in which one example of this invention is shown

[Drawing 2] The sectional view which cut the upper part of a cell pack by the A-A line in drawing 1

[Drawing 3] The sectional view which cut the upper part of a cell pack by the B-B line in drawing 1

[Drawing 4] The sectional view showing the formation process of a mold resin layer

[Drawing 5] The sectional view showing the conventional cell pack

[Drawing 6] The sectional view showing the conventional cell pack

[Description of Notations]

10 Cell pack

11 Cell case

20 Cell proper

21 22 Lead wire

30 Protection network

31 Circuit board

32 Electronic parts

34 Mold resin layer

34A Flat side

35 Resin layer agenesis section

43 Presser-foot mold

[Translation done.]

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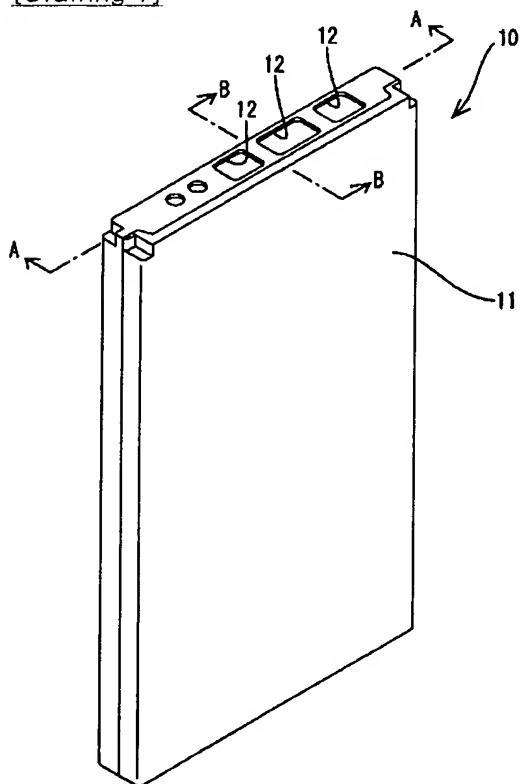
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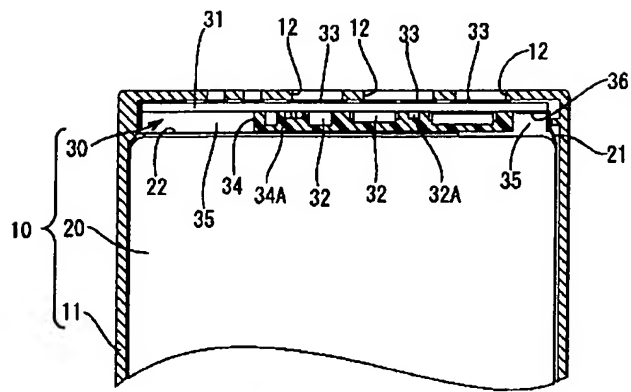
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DRAWINGS

[Drawing 1]

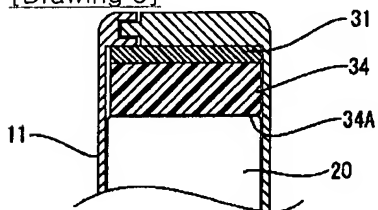


[Drawing 2]

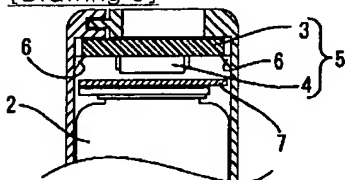


- 10.....電池バック
 11.....電池ケース
 20.....電池本体
 21, 22.....リード線
 30.....保護回路
 31.....回路基板
 32.....電子部品
 34.....モールド樹脂層
 34A.....平坦面
 35.....樹脂層非形成部
 43.....押さえ型

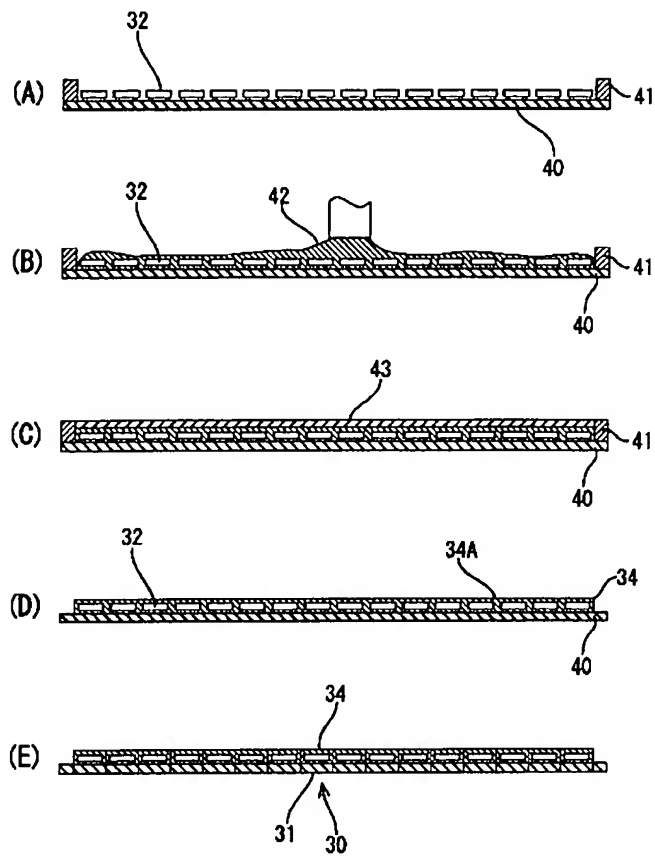
[Drawing 3]



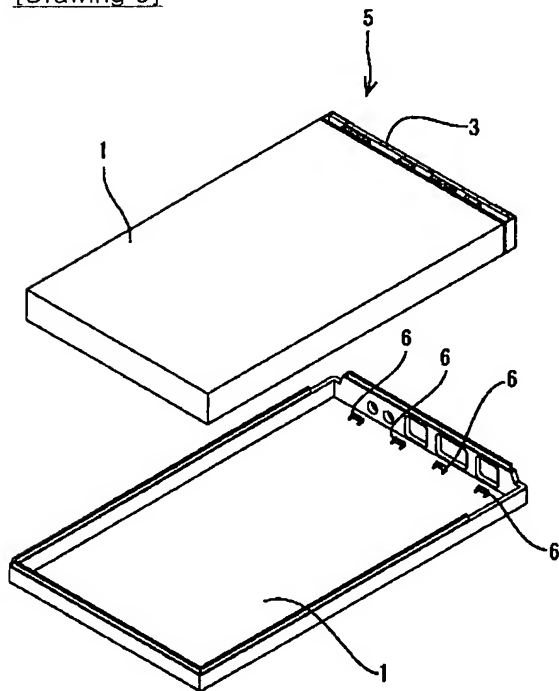
[Drawing 5]



[Drawing 4]



[Drawing 6]



[Translation done.]